

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report Proposed Amended Rule 1401 – New Source Review of Toxic Air Contaminants, and Impact Assessment for Facilities Subject to Rule 1402 – Control of Toxic Air Contaminants from Existing Sources

April 2010

Deputy Executive Officer

Planning, Rule Development, and Area Sources
Elaine Chang, DrPH

Assistant Deputy Executive Officer

Planning, Rule Development, and Area Sources
Laki Tisopulos, Ph.D., P.E.

Planning and Rules Manager

Planning, Rule Development, and Area Sources
Susan Nakamura

Author:	Tim Kobata – Air Quality Specialist
Technical Assistance:	Tom Chico – Program Supervisor
Reviewed by:	Cheryl Marshall – Program Supervisor William Wong – Principal Deputy District Counsel

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
GOVERNING BOARD**

CHAIRMAN: WILLIAM A. BURKE, Ed.D.
Speaker of the Assembly Appointee

VICE CHAIRMAN: DENNIS YATES
Mayor, City of Chino
Cities Representative, San Bernardino County

MEMBERS: MICHAEL D. ANTONOVICH
Supervisor, Fifth District
Los Angeles County

MARION ASHLEY
Supervisor, Fifth District
Riverside County

MICHAEL A. CACCIOTTI
Councilmember, City of South Pasadena
Cities Representative, Los Angeles County, Eastern Region

BILL CAMPBELL
Supervisor, Third District
County of Orange

JANE W. CARNEY
Senate Rules Committee Appointee

JOSIE GONZALES
Supervisor, Fifth District
San Bernardino County

RONALD O. LOVERIDGE
Mayor, City of Riverside
Cities Representative, Riverside County

JOSEPH K. LYOU, Ph.D.
Governor's Appointee

JUDITH MITCHELL
Councilmember, Rolling Hills Estates
Cities Representative, Los Angeles County, Western Region

JAN PERRY
Councilmember, City of Los Angeles
Representative, City of Los Angeles

MIGUEL PULIDO
Mayor, City of Santa Ana
Cities Representative, Orange County

EXECUTIVE OFFICER: BARRY R. WALLERSTEIN, D.Env.

TABLE OF CONTENTS

TABLE OF CONTENTS	i
LIST OF TABLES	i
EXECUTIVE SUMMARY	
BACKGROUND	ES-1
PROPOSED AMENDMENTS TO RULE 1401	ES-1
IMPACT ASSESSMENT FOR PROPOSED AMENDED RULE 1401	ES-2
IMPACT ASSESSMENT FOR FACILITIES SUBJECT TO RULE 1402	ES-3
CHAPTER 1: BACKGROUND	
INTRODUCTION	1-1
REGULATORY HISTORY	1-1
COMPOUNDS WITH NEW OR AMENDED RELS	1-2
AFFECTED INDUSTRIES	1-5
CHAPTER 2: SUMMARY OF PROPOSED AMENDED RULE 1401	
OVERVIEW	2-1
PROPOSED CHANGES TO RULE 1401	2-1
CHAPTER 3: IMPACT ASSESSMENT	
INTRODUCTION	3-1
IMPACT ASSESSMENT FOR PROPOSED AMENDED RULE 1401	3-2
IMPACT ASSESSMENT FOR FACILITIES SUBJECT TO RULE 1402	3-3
POTENTIAL COST IMPACTS	3-5
POTENTIAL ENVIRONMENTAL IMPACTS	3-5
DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727	3-5
COMPARATIVE ANALYSIS	3-6
REFERENCES	
LIST OF TABLES	
TABLE 1 – CHRONIC REL SUMMARY	
TABLE 2 – ACUTE REL SUMMARY	
TABLE 3 – RISK VALUES	

EXECUTIVE SUMMARY

BACKGROUND

PROPOSED AMENDMENTS TO RULE 1401

IMPACT ASSESSMENT FOR PROPOSED AMENDED RULE 1401

IMPACT ASSESSMENT FOR FACILITIES SUBJECT TO RULE 1402

BACKGROUND

Rule 1401 – New Source Review for Toxic Air Contaminants (TACs) was adopted by the AQMD Governing Board in June 1990. The rule establishes cancer and non-cancer risk requirements for new, relocated, or modified sources of toxic air pollutants. It has been amended several times to add new compounds to the list of TACs as they have been identified and health risk values were finalized or amended. Rule 1402 – Control of Toxic Air Contaminants from Existing Sources was adopted April 8, 1994. It establishes facility-wide health risk requirements for existing facilities. Rule 1402 implements the AB 2588 Air Toxics Hot Spots Program. Rule 1402 may require toxic emissions inventories, health risk assessments (HRA), public notification, and/or risk reduction for facilities with emission levels that are above the specified risk thresholds.

The state's Office of Environmental Health Hazard Assessment (OEHHA) establishes risk exposure levels (i.e., risk values) for TACs. The Scientific Review Panel (SRP) reviews and approves the methodologies used to develop these risk values, thereby finalizing the values for use by state and local agencies in assessing health risks related with exposure to TACs. Rule 1401 requires that compounds be added to the Rule 1401 list of toxic air contaminants when the Scientific Review Panel and OEHHA approve new or revised risk values. Rule 1402 also relies on the Rule 1401 list of toxic air contaminants.

Rule 1401(e)(3)(B) requires a report on the impacts, including socioeconomic impacts, of adding new compounds or risk values. Rule 1402 is not being amended, however, the list of TACs in Rule 1401 is also used for Rule 1402. Paragraph (j)(4) of Rule 1402 requires a report to the Governing Board regarding preliminary estimates of Rule 1402 impacts that are associated with the addition of new compounds or risk values.

PROPOSED AMENDMENTS TO RULE 1401

On December 19, 2008, the Office of Environmental Health Hazard Assessment (OEHHA) adopted new acute, 8-hour, and chronic reference exposure levels (RELs) for acetaldehyde, acrolein, arsenic, formaldehyde, manganese, and mercury. Also, on August 14, 2003, new chronic risk values for fluorides, including hydrogen fluoride, were approved by the state. Risk values for fluorides have not been added to Rule 1401 because the required impact assessment and permit evaluations could not be completed for multi-pathway exposure. The California Air Resources Board's (CARB) air dispersion modeling program, Hotspots Analysis Reporting Program (HARP), now provides the necessary tools to determine the multi-pathway factor for fluorides. Therefore, the multi-pathway assessment required to conduct health risk assessments and permit evaluations has been completed and chronic RELs for these compounds can be included as part of the proposed amendments to Rule 1401.

Once OEHHA has adopted a risk value, Rules 1401 – New Source Review of Toxic Air Contaminants and 1402 – Control of Toxic Air Contaminants from Existing Sources, require staff to notify the AQMD's Governing Board and affected parties of OEHHA's actions and that

risk values for toxic air contaminants are proposed to be added to or changed in Rule 1401. Staff provided notification of the state-approved chronic risk values for fluorides, including hydrogen fluoride, on January 9, 2004. On April 3, 2009, staff provided notification to the Governing Board for the new risk values for acetaldehyde, acrolein, arsenic, formaldehyde, manganese, and mercury. An analysis and report to the Board are required before any new or updated risk factors are used for Rules 1402 and 1402.

The AQMD staff is proposing to add new or revise existing non-cancer chronic and acute RELs for acetaldehyde, acrolein, arsenic, fluorides, formaldehyde, manganese, and mercury, to the Rule 1401 list of toxic air contaminants. Rule 1402 is not being amended, however, it also uses the list of TACs in Rule 1401. The effective date for the new and revised risk values will be the date of adoption of Proposed Amended Rule 1401. Pursuant to Rule 1402 (j)(3), the effective date for use of the new and revised risk values for existing sources of TACs is 12 months after the Governing Board receives and files the notification of intent to add the risk values, unless the Board approves another implementation schedule through an official Board action.

RELs are associated with non-cancer health impacts, either from long-term (chronic) or short-term (acute) exposures to the compound and represent exposures or doses at or below which adverse health effects are not likely to occur. The RELs adopted by OEHHA in December 2008, were evaluated by the Scientific Review Panel using a new methodology which was developed for OEHHA's draft "Air Toxics Hot Spots Program Technical Support Document for the Derivation of Noncancer Reference Exposure Levels" (TSD). The Scientific Review Panel approved the final versions of the methodology section of the TSD on June 18, 2008. The new methodology reflects scientific knowledge and techniques developed since the previous Air Toxics "Hot Spots" guidelines were prepared, and includes consideration of possible differential effects on the health of infants, children, and other sensitive subpopulations. The new methodology takes into consideration the physiological, biochemical, and behavioral differences between adults and infants and children. In addition to the new methodology, data from recent health studies were used to derive the RELs. As a result, some of the amended values are more stringent and some are less stringent than previously identified. Note that the 8-hour RELs will not be added at this time because they are not included in the Hot Spots Analysis Reporting (HARP) program. These 8-hour health factors will be added following OEHHA approval of the most recent Guidelines Manual (Part V).

IMPACT ASSESSMENT FOR PROPOSED AMENDED RULE 1401

Rule 1401(e)(3)(B) requires a report on the impacts, including socioeconomic impacts, of adding new compounds or risk values. An impact analysis is being conducted to determine the potential number of permits on an annual basis that may require further emission controls to reduce TAC emissions to a level below where no potential chronic or acute health risk exists. The assessment uses AQMD permitting and AB2588 databases to identify potential adverse impacts resulting from the new or revised RELs included in this amendment. Analysis of toxics emissions data indicate that the majority of TACs included in this amendment are constituents of the exhaust from the combustion of various fuels. Thus far, AQMD staff has found no impacts for new, modified, or relocated sources subject to Rule 1401 based on analysis of permitting data and

Annual Emissions Reporting data for 2003 through 2007. However, AQMD staff will continue the permitting analysis to identify potential impacts for sources with emissions of the aforementioned chemicals. Chapter 3 contains a more detailed discussion of the impact analysis.

IMPACT ASSESSMENT FOR FACILITIES SUBJECT TO RULE 1402

Rule 1402 – Control of Toxic Air Contaminants from Existing Sources establishes facility-wide risk requirements for existing facilities that emit TACs and implements the AB 2588 Air Toxics Hot Spots Program. Paragraph (j)(4) of Rule 1402 requires a report to the Governing Board regarding preliminary estimated impacts associated with the addition of new compounds or risk values to the list of TACs in Rule 1401. This report contains the assessment of potential impacts of new and revised RELs on facilities subject to Rule 1402, based on an analysis using data from the AB2588 toxics emissions database. Evaluation of toxics emissions data indicate that the majority of TACs included in this amendment are constituents of the exhaust from the combustion of various fuels. Analysis showed that adding or revising RELs for acetaldehyde, acrolein, arsenic, fluorides, formaldehyde, manganese, and mercury will have minimal impacts on existing facilities under Rule 1402. The new and revised RELs are not expected to cause any additional AB2588 facilities to conduct health risk assessments or require any additional controls. Chapter 3 of this report contains a more detailed discussion of the impact analysis.

CHAPTER 1: BACKGROUND

INTRODUCTION

REGULATORY HISTORY

**COMPOUNDS WITH NEW OR AMENDED REFERENCE EXPOSURE
LEVELS**

AFFECTED INDUSTRIES

INTRODUCTION

Rule 1401 – New Source Review for Toxic Air Contaminants establishes cancer and non-cancer risk requirements for new, relocated, or modified sources emitting toxic air contaminants listed in the rule. The current proposal would add new or amended chronic and acute Reference Exposure Levels (RELs) for acetaldehyde, acrolein, arsenic, formaldehyde, manganese, and mercury that were approved by OEHHA on December 19, 2008. Notification to the Governing Board was provided on December 19, 2008 of staff's intention to add these RELs. In addition, new chronic risk values for fluorides, including hydrogen fluoride, which were approved by OEHHA on August 14, 2003 can now be added. Notification to the Governing Board for the fluoride compounds was made on January 9, 2004, however the risk values were not added to Rule 1401 at that time because California Air Resources Board's (CARB) air dispersion modeling program, Hotspots Analysis Reporting Program (HARP) did not provide the necessary tools to calculate the multi-pathway exposure assessments which are needed for health risk assessments and permit evaluations. HARP now includes the multi-pathway factor and the new chronic RELs for these compounds can be included as part of the proposed amendments to Rule 1401. In addition, AQMD's guidance document for risk assessment, "Risk Assessment Procedures for Rules 1401 and 212", will be updated to include the new risk values.

Rule 1401(e)(3)(B) requires a report on the impacts, including socioeconomic effects, of adding new compounds or adding/amending risk values. AQMD staff is conducting an analysis to identify potential impacts for new and existing sources of the compounds listed. Based on the analysis thus far, adding the new RELs and amending the existing RELs is expected to have minimal impacts for new, modified, or relocated sources subject to Rule 1401. Rule 1402 – Control of Toxic Air Contaminants from Existing Sources uses the list of TACs in Rule 1401 and Paragraph (j)(4) of Rule 1402 requires a report to the Governing Board regarding preliminary estimates of Rule 1402 impacts that are associated with the addition/amendment of the risk values. AQMD staff's analysis also showed that there will be no impacts to existing facilities under Rule 1402. Chapter 3 contains the impact analysis for both rules.

REGULATORY HISTORY

Rule 1401 – New Source Review for Toxic Air Contaminants (TACs) was adopted by the AQMD Governing Board in June 1990. The rule establishes cancer and non-cancer risk requirements for new, relocated, or modified sources of toxic air pollutants. It is amended periodically to add new compounds or new risk values to the list of TACs as they are identified and risk values are finalized or amended by the state.

Rule 1402 – Control of Toxic Air Contaminants from Existing Sources was adopted in April 1994. It establishes facility-wide risk requirements for existing facilities that emit TACs and implements the state AB2588 Air Toxics "Hot Spots" program. Rule 1402 is not being amended, however the list of TACs in Rule 1401 are also used for Rule 1402. Depending on the facility and its potential toxic risk, Rule 1402 may require toxic emissions inventories, health risk assessments (HRA), public notification, and/or risk reduction as required under the AB 2588 Air Toxics "Hot Spots" Program.

COMPOUNDS WITH NEW OR AMENDED REFERENCE EXPOSURE LEVELS

ACETALDEHYDE

Acetaldehyde was added to Rule 1401 as a TAC in 1990, as a probable human carcinogen, based on sufficient evidence of carcinogenicity in experimental animals. In 1998, a chronic REL for non-cancer health effects was added, based on the compound's effects on the respiratory system. In 2008, a new acute REL was adopted by OEHHA and the existing chronic REL was increased, making it less stringent. A higher chronic REL indicates a higher dose level at or below which no adverse health impacts are expected. The major acute effects of human exposure to acetaldehyde vapors consist of irritation to the eyes, skin, and respiratory tract and bronchoconstriction in asthmatics. Chronic exposure affects the respiratory system.

ACROLEIN

In 1999, Acrolein was added to Rule 1401 as a TAC with acute health impacts, based on effects to the eyes, nose and throat. A chronic REL was added in 2001, based on effects on the respiratory system. Both the acute and chronic REL values for acrolein were increased by OEHHA and are therefore less stringent than previous values. Acute effects of acrolein exposure affect the eyes and chronic exposure affects the respiratory system.

ARSENIC AND INORGANIC ARSENIC COMPOUNDS, INCLUDING ARSINE

Arsenic and inorganic arsenic compounds were added to the Rule 1401 list of TACs in 1990, based on their classification as probable human carcinogens. Acute RELs for arsenic, inorganic arsenic compounds, and arsine were added in 1999, based on effects to the cardiovascular system, the nervous system and fetal development (teratogenicity). In 2001, chronic RELs were added for arsenic and inorganic arsenic compounds, based on effects to fetal development, the cardiovascular system, the nervous system, lungs, and skin. Arsenic also has an oral pathway. Both the acute and chronic REL values were changed for inorganic arsenic. The new acute value is less stringent than the previous value. The chronic value is more stringent than previously.

FLUORIDES AND HYDROGEN FLUORIDE

In 2004, the state approved chronic RELs for fluorides, including hydrogen fluoride, based on long-term effects to the respiratory system, bones, and teeth. At that time, staff recommended that the chronic values not be added to Rule 1401 because the required Rule 1402 impact assessment and permit evaluations could not be completed until a multi-pathway assessment was done. A multi-pathway assessment is required when compounds have more than one route (pathway) of exposure. These compounds have an oral pathway in addition to the inhalation pathway. Tools are now available to determine the multi-pathway factor for fluorides, so chronic risk values for these compounds will be included as part of proposed amendments to Rule 1401. New chronic RELs for fluorides and hydrogen fluoride were added and the acute REL for hydrogen fluoride remains unchanged.

FORMALDEHYDE

Formaldehyde was added to Rule 1401 as a TAC in 1990, based on its classification as a probable human carcinogen. An acute REL was added in 1999, due to the mild to moderate eye irritation caused by acute formaldehyde exposure. In 2000, a chronic REL was added, based on long-term effects such as nasal obstruction and discomfort, lower airway discomfort, and eye

irritation. Both the acute and chronic REL values were changed for formaldehyde. The new acute value is more stringent than the previous value and the chronic value is less stringent.

MANGANESE AND MANGANESE COMPOUNDS

Chronic risk values for manganese and manganese compounds were added to Rule 1401 in 2000, based on long-term effects to the nervous system. An acute risk value for manganese has not been developed at this time. The chronic REL for manganese was changed and the new value is more stringent than the previous value. Chronic exposure to manganese affects the nervous system.

MERCURY AND INORGANIC MERCURY COMPOUNDS

In 1999, an acute risk value for mercury and mercury compounds (inorganic) was added to Rule 1401 based on short-term exposure effects to development and the nervous system. A chronic risk value was added in 2000, based on effects to the central nervous system. Neurotoxicity is the most sensitive effect of mercury exposure. Mercury also has an oral exposure pathway. Both the chronic and acute RELs for mercury were changed and the new values are more stringent than the previous values.

Tables 1 and 2 summarize the REL values being added or changed in Proposed Amended Rule 1401. The table also indicates where the new values are more or less stringent than current RELs. In addition, Table 1 indicates whether or not the compound has a cancer potency risk that is more stringent than the chronic REL and is, therefore, the “driver” for long term risk.

Table 1 - Chronic REL Summary

Toxic Air Contaminant	CAS #	Existing Chronic REL (ug/m ³)	New Chronic REL (ug/m ³)	Change in REL	Does Cancer Risk Drive Risk?
Acetaldehyde	75-07-0	9	140	Less Stringent	Yes
Acrolein	107-02-8	0.06	0.35	Less Stringent	No
Arsenic	7440-38-2	0.03	0.015	More Stringent	Yes
Formaldehyde	50-00-0	3	9	Less Stringent	Yes
Manganese	7439-96-5	0.2	0.09	More Stringent	No
Mercury	7439-97-6	0.09	0.03	More Stringent	No
Fluorides		n/a	13	New	No
Hydrogen Fluoride	7664-39-3	n/a	14	New	No

Table 2 - Acute REL Summary

Toxic Air Contaminant	CAS #	Existing Acute REL (ug/m ³)	New Acute REL (ug/m ³)	Change in REL
Acetaldehyde	75-07-0	n/a	470	New
Acrolein	107-02-8	0.19	2.5	Less Stringent
Arsenic	7440-38-2	0.19	0.2	Less Stringent
Formaldehyde	50-00-0	94	55	More Stringent
Manganese	7439-96-5	n/a	n/a	n/a
Mercury	7439-97-6	1.8	0.6	More Stringent
Fluorides		n/a	n/a	n/a
Hydrogen Fluoride	7664-39-3	240	240	No change

AFFECTED INDUSTRIES

Emissions of acetaldehyde, acrolein, arsenic, fluorides, formaldehyde, manganese, and mercury are generated from a wide variety of sources. The following outlines the industries potentially affected as a result of the proposed addition or revision of risk values on Table I of Rule 1401.

ACETALDEHYDE

Acetaldehyde is a colorless liquid or gas and is commonly used as an intermediate for the manufacture of a number of other chemicals. Permitted sources which may have acetaldehyde emissions include manufacturers of chemicals, wood-based building products such as fiberboard, particleboard, sheet vinyl flooring, and carpeting. Acetaldehyde is also a component in the exhaust from the combustion of various fuels, including natural gas and diesel fuel.

ACROLEIN

Acrolein is a colorless or yellow liquid with a piercing disagreeable odor. Its principal industrial use is as a chemical intermediate in the production of acrylic acid and its esters. It is also a product of natural gas and diesel fuel combustion.

ARSENIC AND INORGANIC ARSENIC COMPOUNDS, INCLUDING ARSINE

Industries with permitted sources of arsenic emissions include metal processes; pesticide manufacturing; ceramics; pharmaceuticals; and semiconductor manufacturing. Ore refining processes, including the smelting of copper and lead, are the major sources of the release of arsenic compounds. Processes such as smelting, galvanizing, soldering, and etching, which require the treatment of metal with strong acids are possible sources of arsine gas. Arsenic may also be a by-product of the combustion of diesel fuel, digester gas and landfill gas.

FLUORIDES AND HYDROGEN FLUORIDE

Hydrogen Fluoride (HF) is an acid (hydrofluoric acid) and is a colorless, fuming liquid with a sharp, penetrating odor. Hydrofluoric acid is used in a variety of industries, including, glass etching, electronics, microelectronics, petroleum refining, and chemical industries. HF is used in the manufacture of computer chips, phosphate fertilizer, metal cans, plastics, refrigerant chemicals, inorganic chemicals, soaps, detergents, commercial rust removal products, and aircraft parts. HF is also used as a catalyst in petroleum alkylation to make high-octane gasoline. HF is also emitted during the manufacture of brick and structural clay products, such as clay pipe, adobe brick, chimney pipe, flue liners, drain tiles, roofing tiles, and sewer tiles. HF and other fluoride compounds are emitted from kilns as a result of the release of the fluorine compounds contained in the raw material.

FORMALDEHYDE

The four major applications of formaldehyde are as an intermediate in the manufacture of melamine, polyacetal, and phenolic resins; as an intermediate in the production of industrial chemicals; as a bactericide or fungicide; and as a component in the manufacture of end-use consumer products. Permitted sources which produce plywood, particleboard, foam insulation, and molded or extruded plastic items may also have formaldehyde emissions. Formaldehyde is also a product of fuel combustion, including natural gas, diesel, landfill gas, and digester gas.

MANGANESE AND MANGANESE COMPOUNDS

Metallic manganese is used in many permitted manufacturing processes. Manganese is used in the manufacturing of steel, carbon steel, stainless steel, cast iron, and superalloys to increase hardness, stiffness, and strength. Other processes with manganese emissions include textile printing and dyeing; battery manufacturing; pharmaceutical and food manufacturing; ceramics and colored glass industries; paint manufacturing; and fertilizer and fungicide manufacturing. Manganese is also used as an octane enhancer in some unleaded gasolines and is released during fuel combustion. Additionally, manganese is a component in the exhaust from diesel and landfill gas combustion.

MERCURY AND INORGANIC MERCURY COMPOUNDS

Mercury and mercury-containing compounds are widely used. Permitted facilities which use mercury in the manufacture of thermometers, barometers, and thermostats may be affected by the new RELs. Mercury is commonly used for these applications due to its uniform volume expansion over a broad temperature range. Industries which use mercury to make mercury arc and fluorescent lamps; as a catalyst in oxidation of organic compounds; as a cathode in electrolysis also have mercury emissions. Other industries with mercury emissions include pulp and paper manufacturing; battery manufacturing; dental amalgam manufacturing; manufacturing of switching devices such as oscillators; and manufacturing of chlorine and caustic soda. Mercury is also used as a grain fumigant, in agricultural chemicals, in pharmaceuticals, as a preservative, as a lubricant, and as a laboratory reagent. Mercury is also a byproduct of the combustion of diesel fuel and landfill gas.

CHAPTER 2: SUMMARY OF PROPOSED AMENDED RULE 1401

OVERVIEW

PROPOSED CHANGES TO RULE 1401

OVERVIEW

The primary purpose of amending Rule 1401 is to add and revise REL values for acetaldehyde, acrolein, arsenic, fluorides, formaldehyde, manganese, and mercury on the list of TACs in Table I of the rule. Rule 1402 is not being amended, however, the list of TACs in Rule 1401 is also used for Rule 1402 and an analysis of impacts on Rule 1402 facilities is required when new compounds are added.

PROPOSED AMENDMENTS TO RULE 1401

On December 19, 2008, the Office of Environmental Health Hazard Assessment (OEHHA) adopted new acute, 8-hour, and chronic reference exposure levels (RELs) for acetaldehyde, acrolein, arsenic, formaldehyde, manganese, and mercury (See Table 3 for the new/revised chronic and acute RELs and the corresponding Screening Values). The RELs adopted by OEHHA were evaluated by the Scientific Review Panel using a new methodology which was developed for OEHHA's draft "Air Toxics Hot Spots Program Technical Support Document for the Derivation of Noncancer Reference Exposure Levels" (TSD). The Scientific Review Panel approved the final versions of the methodology section of the TSD on June 18, 2008. The Scientific Review Panel approved the final versions of the methodology section of the TSD on June 18, 2008. The new methodology reflects scientific knowledge and techniques developed since the previous Air Toxics "Hot Spots" guidelines were prepared, and includes consideration of possible differential effects on the health of infants, children, and other sensitive subpopulations. The new methodology takes into consideration the physiological, biochemical, and behavioral differences between adults and infants and children. In addition to the new methodology, data from recent health studies were used to derive the RELs. As a result, some of the amended values are more stringent and some are less stringent than previously identified.

The current proposal would add new or revise existing OEHHA-approved acute and chronic Reference Exposure Levels (RELs) for several compounds on the Rule 1401 list of Toxic Air Contaminants (TACs). Compounds to be included in this rule revision are: acetaldehyde, acrolein, arsenic, fluorides, formaldehyde, manganese, and mercury. In addition, AQMD's guidance document for risk assessment, "Risk Assessment Procedures for Rules 1401 and 212," will be updated to include the new and revised risk values.

Note that the 8-hour RELs will not be added at this time because they are not included in the Hot Spots Analysis Reporting (HARP) program. These 8-hour health factors will be added following OEHHA approval of the most recent Guidelines Manual (Part V). HARP is CARB's integrated software package used by air pollution control and air quality management districts, facility operators, and other parties to promote statewide consistency, efficiency, and cost-effective development of facility and emission inventories and health risk assessments.

Table I of Rule 1401 lists toxic air contaminants for which OEHHA has approved cancer and/or non-cancer risk values and the dates on which the values were added to Rule 1401. Table 3 below shows the RELs and the corresponding screening values to be added to the AQMD's

“Risk Assessment Procedures for Rules 1401 and 212” upon adoption of the proposed rule amendments. The screening value is a conservative estimate of the amount of emissions of each contaminant required to produce a non-cancer chronic or acute hazard index of 1. Although some compounds have chronic risk values for long-term non-cancer health effects, the cancer risk outweighs the chronic risk. The cancer risk results in a more stringent screening value than the new screening value for acetaldehyde, arsenic, and formaldehyde, and will appear in the “Risk Assessment Procedures for Rules 1401 and 212.” The effective date for the risk value will be the date of adoption of Proposed Amended Rule 1401.

Table 3 – Chronic and Acute Reference Exposure Levels and Screening Values

Compound	CAS	Chronic Reference Exposure Level (ug/m ³)	Chronic Screening Value at 25 m (lb/yr)	Acute Reference Exposure Level (ug/m ³)	Acute Screening Value at 25 m (lb/hr)
Acetaldehyde	75-07-0	140	4,630 ¹	470	0.235
Acrolein	107-02-8	0.35 ²	11.6	2.5 ²	0.00125
Arsenic & inorganic arsenic compounds (including arsine)	7440-38-2	0.015	0.012 ¹	0.20 ²	0.0001
Formaldehyde	50-00-0	9	298 ¹	55	0.0275
Manganese & manganese compounds	7439-96-5	0.09	2.98	N/A	N/A
Mercury & inorganic mercury compounds	7439-97-6	0.03	0.149	0.6	0.0003
Fluorides (except hydrogen fluoride, listed separately below)		13	430	N/A	N/A
Hydrogen Fluoride	7664-39-3	14	463	Unchanged	Unchanged

¹ The cancer screening values for acetaldehyde, arsenic, and formaldehyde are more stringent than the chronic screening values. Therefore, the screening value based on cancer risk will be used as the screening value in AQMD’s “Risk Assessment Procedures for Rules 1401 and 212.”

² The noted risk values are less stringent than the current values in AQMD’s “Risk Assessment Procedures for Rules 1401 and 212.”

CHAPTER 3: IMPACT ASSESSMENT

INTRODUCTION

IMPACTS OF PROPOSED AMENDMENTS TO RULE 1401

IMPACT ASSESSMENT FOR FACILITIES SUBJECT TO RULE 1402

POTENTIAL COST IMPACTS

POTENTIAL ENVIRONMENTAL IMPACTS

**DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY
CODE SECTION 40727**

COMPARATIVE ANALYSIS

INTRODUCTION

An analysis of the impacts is required when adding new compounds or health risk values to the list of TACs. Rule 1401(e)(3)(B) requires a report on the impacts, including socioeconomic impacts, to new, modified or relocated sources. Rule 1402(j)(4) requires a report to the Governing Board regarding preliminary estimates of Rule 1402 impacts that are associated with the addition of new compounds or risk values.

The impact analysis for Rules 1401 and 1402 focused on those chemicals with new and revised chronic and acute RELs which are more stringent than existing RELs (See Tables 1 & 2 in Chapter 1). However, final analysis included all the new/amended RELs to assess the overall impact of the proposed changes. Where revised RELs were made less stringent than existing values, no further analysis was conducted, because the less stringent RELs would not impose any additional requirements on new permits or existing facilities. In addition, chronic RELs were only evaluated if cancer risk was not the “driver” for long term risk. For chemicals with cancer risk values which are more stringent than the chronic risk values, the cancer risk values take precedence over the chronic risk values and are the primary influence for the need to reduce risk. As required by Rules 1401 and 1402, impacts from the cancer risk values were analyzed when the values were adopted. Since the cancer risk values are more stringent (i.e., more protective of public health) than the chronic risk values, the cancer risk values will be the overriding factor for any risk assessments related to long term health impacts for these compounds. Therefore, no further analysis was conducted for chronic risk for these chemicals since there would be no additional impacts.

IMPACT ANALYSIS APPROACH

Since many of the TACs with new or revised RELs are constituents of the exhaust from fuel combustion, the impact analysis separately evaluated combustion and non-combustion sources of the TACs. The analysis for combustion equipment evaluated concurrent impacts from Rules 1401 and 1402. Non-combustion equipment impacts were evaluated separately for Rules 1401 and 1402. The following discussion of combustion impacts applies to equipment subject to Rule 1401 and facilities subject to Rule 1402.

COMBUSTION SOURCES – RULE 1401 & RULE 1402

Review of toxics emissions data revealed that the majority of emissions of the TACs with new or revised RELs are constituents of the exhaust from combustion of various fuels. Six out of the seven TACs with new or revised RELs (acetaldehyde, acrolein, arsenic, formaldehyde, mercury, manganese) have been identified as constituents in the exhaust from diesel fuel combustion. Diesel particulate matter (DPM) from internal combustion engines has a cancer potency value and a chronic REL which incorporate risk from all of the speciated TACs found in diesel exhaust. The cancer potency value for diesel exhaust is the “driver” for long term risk, therefore, this equipment category was excluded from the current analysis.

In addition, the same six TACs have also been identified as constituents in the exhaust from combustion of other fuels, such as natural gas, landfill gas, and digester gas. The overall impact on risk from various types of combustion equipment utilizing natural gas, landfill gas, LPG/propane/butane, and digester gas, was assessed by calculating the impact on hazard index values using AER default combustion emission factors, existing RELs, and new/revised RELs. Comparisons were made to assess impacts to overall HI values resulting from the new/revised RELs.

Chronic and acute risk increase for landfill gas-fired external combustion equipment (boilers, ovens, heaters, furnaces, afterburners, dryers) when calculated with the new/revised RELs. A recent risk evaluation for a landfill project involving landfill gas-fired external combustion equipment indicated that the chronic and acute risk for each piece of equipment and the total project were well below the hazard index thresholds (HI of 1). In addition, the cancer risk far outweighed the chronic risk for this project, therefore, no further analysis was done for landfill-gas combustion. Some existing facilities with landfill gas emissions were identified in the Rule 1402 analysis, however their status in the AB2588 program was not changed due to the proposed amendment.

Using the new/revised RELs, chronic and acute risk values for digester gas-fired internal combustion equipment increased (approximately 12% for chronic and less than 1% for acute). Based on calculations utilizing the new RELs, chronic and acute HI values are typically well below 1 for this type of equipment. Analysis indicates that impacts to Rule 1401 are unlikely due to the stringent requirements outlined in the source-specific rule for internal combustion engines (Rule 1110.2) in combination with a limited number of new permits for this type of equipment. Rule 1402 analysis also identified facilities with digester gas emissions, however there was no impact on their status in the AB2588 program based on the new RELs.

Overall chronic and acute risk values decreased for internal and external combustion equipment utilizing natural gas, LPG, butane, and propane, when calculated using the new/revised RELs, due to some RELs being less stringent and others more stringent. For example, natural gas-fired external combustion equipment emits acetaldehyde, acrolein, and formaldehyde. The total chronic and acute HI values calculated with the new/revised RELs resulted in a net decrease in HI values, compared to the chronic and acute HI values calculated with existing RELs. This is primarily due to the fact that the new chronic and acute RELs for acrolein are far less stringent than previous values. Acrolein accounts for 29% of the total chronic HI value and 45% of the total acute HI value, while acetaldehyde and formaldehyde represent less than 1% and 7% of the chronic HI and less than 1% and 13% of the acute HI, respectively. Based on these findings, no further analysis was needed for this type of equipment.

Impact analysis focused on the new or revised chronic and acute RELs for the following chemicals: manganese and mercury chronic RELs that are more stringent than existing chronic risk values and do not have cancer risk values; formaldehyde and mercury acute RELs that are more stringent than existing acute risk values; new chronic RELs for fluorides and a new acute REL for acetaldehyde. Based on the Rule 1401 impact analysis, no additional impacts to new permits have been identified at this time, however, AQMD staff will continue the permitting analysis to identify any potential impacts for new, relocated, or modified sources with emissions

of the aforementioned chemicals. No additional impacts to existing facilities were identified by the Rule 1402 impact analysis.

NON-COMBUSTION SOURCES - RULE 1401

The impact analysis for Rule 1401 utilized the Annual Emissions Reporting (AER) air toxics emissions database and AQMD permitting data to assess impacts from the new or revised chronic and acute RELs on new, relocated, or modified permit units subject to Rule 1401. Under Rule 1401, the new or revised RELs for acetaldehyde, acrolein, arsenic, fluorides, formaldehyde, manganese, and mercury will be used to calculate the chronic and acute hazard indices (HI) for new, modified, or relocated equipment requiring a permit to operate. Rule 1401 requires that all such sources have a chronic and/or acute HI less than 1.

The first step in the analysis was to compile facility emissions data from the AER database. The database was queried for facility information and reported toxics emissions data for acetaldehyde, acrolein, arsenic, formaldehyde, manganese, mercury and hydrogen fluoride. It should be noted that fluoride emissions are not currently collected by the District, however, several facilities report hydrogen fluoride emissions. Therefore, the analysis for hydrogen fluoride is based on this limited emissions data. Following data collection, calculations were performed to determine the screening values representative of a HI of 1, for those compounds with new or more stringent RELs. The screening values represent the emission level (pounds per year for chronic, or pounds per hour for acute) of a TAC which could trigger an exceedance of HI of 1. The screening values for each compound were calculated utilizing the methodology outlined in the Rule 1401 guidance document, "Risk Assessment Procedures for Rules 1401 and 212" and are based on "worst case" factors for chronic and acute health effects.

Review of toxics emissions data was conducted to identify facilities with emissions of the TACs with new or revised RELs which exceeded the chronic or acute screening values. Facilities with toxics emissions exceeding the screening values were further analyzed by evaluating individual equipment types at each facility. AQMD historical permitting data was utilized to determine if risk values for individual equipment would exceed screening values (i.e., HIC >1 or HIA >1) as a result of the new or revised RELs.

Following examination of permit data for equipment with emissions of the TACs with new or more stringent RELs, no impacts to risk values for individual permit units have been found thus far. However, further investigation is being conducted to assess the impacts on non-combustion equipment resulting from the new and revised RELs for acetaldehyde, formaldehyde, manganese and mercury. Where necessary, HI values for permit units are calculated to determine if risk increases significantly as a result of the REL changes, and if additional emission controls would be required for permit units in order to comply with risk requirements. Findings and conclusions derived from this analysis will be included in the Draft Staff Report.

NON-COMBUSTION SOURCES - RULE 1402

Paragraph (j)(4) of Rule 1402 requires a report to the Governing Board regarding preliminary estimates of Rule 1402 impacts that are associated with the addition of new compounds to the list

of TACs in Rule 1401. Since the list of TACs in Rule 1401 is also used for Rule 1402, adding or changing the RELs will affect existing facilities subject to Rule 1402.

The Rule 1402 impact analysis used data extracted from the AER database for facilities with reported emissions of the TACs with new or revised risk values (for acetaldehyde, acrolein, arsenic, formaldehyde, manganese, mercury and hydrogen fluoride). Following data collection, calculations were performed to determine the chronic and acute screening values representative of a HI of 3 (Rule 1402 “Action Risk Level”), for each of the compounds with new or more stringent RELs. The chronic (pounds per year) and acute (pounds per hour) screening values were calculated in accordance with the methodology outlined in the AQMD risk assessment guidance document (Risk Assessment Procedures for Rules 1401 and 212), using both the new chronic or acute REL and the existing REL. The screening values were calculated using the most conservative, or “worst case” factors for pollutant dispersion, receptor distance (25 meters), and meteorological factor.

Facilities with TAC emissions which did not exceed the new screening values were eliminated from the analysis, since their toxics emissions levels would not trigger any new requirements under Rule 1402. Facilities with TAC emissions exceeding the existing screening values were also removed from the data set, since these facilities are currently subject to the rule requirements based on these RELs, and impacts to these facilities were assessed when the existing risk values were adopted. Facilities with TAC emissions that exceeded the new chronic or acute HI of 3 screening value were further analyzed by calculating HI values using the new RELs, actual pollutant dispersion, receptor distances, and meteorological correction factors. Thirty facilities still exceeding an HI of 3 using conservative screening methods were further analyzed by applying priority scores.

Under the AB2588 program, the AQMD utilizes emissions data, the carcinogenic and non-carcinogenic risk values of the substances emitted by a facility, and the distance between the source of emissions and potential receptors to calculate prioritization scores. The priority scores are used to place facilities into high, intermediate, or low priority categories for the purpose of health risk assessment. A priority score of ten (10) or more is considered high, and the facilities are required to submit a toxics emissions inventory and health risk assessments to assess the risk to their surrounding community. Facilities which exceed a cancer risk of ten-in-one million, as demonstrated by an approved HRA, are required to conduct public notification. Facilities which exceed the action risk level of twenty-five-in-one million, as demonstrated by an approved HRA, are required to submit a risk reduction plan and, upon approval, implement the strategies to reduce risk within three years. Facilities which exceed the significant risk level of one hundred-in-one million are required to reduce risk as soon as possible.

Prioritization scores were analyzed for 30 facilities, including impacts from all new and revised RELs, in order to assess overall impacts from this rule amendment. Two sets of prioritization scores were calculated for the affected facilities, using the existing RELs (if applicable) and the new and revised RELs. Then, the priority score variations were analyzed to determine any potential impacts due to changes or additions of the REL values. For 15 facilities, the priority score for cancer is the overriding consideration for risk, therefore, any Rule 1402/AB2588 requirements for notification, health risk assessment, or risk reduction would be triggered by their cancer risk rather than their acute or chronic hazard indices, regardless of the new/revised

chronic and acute RELs. In addition, priority rankings for all 30 facilities remained the same when calculating priority scores based on the new/revised RELs (i.e., an increase or decrease in priority score did not change the facility's requirements under the rule). Therefore, this rule amendment does not result in any new requirements for facilities subject to Rule 1402.

POTENTIAL COST IMPACTS

The socioeconomic report for Proposed Amended Rules 1401 and 1402 will be available 30 days before the Public Hearing.

POTENTIAL ENVIRONMENTAL IMPACTS

Pursuant to the California Environmental Quality Act (CEQA) and AQMD Rule 110, appropriate documentation will be prepared to analyze any potential adverse environmental impacts associated with PAR 1401. Comments received at the public workshop and CEQA scoping meeting will be considered when preparing the CEQA document.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

Requirements to Make Findings

California Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report.

Necessity

A need exists to adopt Proposed Amended Rule 1401 to accomplish the following:

- protect public health from exposure to toxic air contaminants, including cumulative impacts;
- meet the goals and objectives of the Board's Environmental Justice Initiatives; and
- update the list of toxic air contaminants covered by the rule consistent with those for which the Scientific Review Panel and OEHHA have finalized risk values.

Authority

The AQMD Governing Board has authority to adopt amendments to Rule 1401 pursuant to the California Health and Safety Code Sections 39002, 39650 et. seq., 40000, 40001, 40440, 40441, 40702, 40725 through 40728, 41508, 41700, and 44390 through 44394.

Clarity

Proposed Amended Rule 1401 is written or displayed so that its meaning can be easily understood by the persons directly affected by the rule.

Consistency

Proposed Amended Rule 1401 is in harmony with and not in conflict with or contradictory to, existing statutes, court decisions or state or federal regulations.

Non-Duplication

Proposed Amended Rule 1401 will not impose the same requirements as any existing state or federal regulations. The proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, AQMD.

Reference

By adopting Proposed Amended Rule 1401, the AQMD Governing Board will be implementing, interpreting or making specific the provisions of the California Health and Safety Code Sections 39666 (District new source review rules for toxics), 41700 (nuisance), 44390 et seq. (Risk Reduction Audits and Plans), and Federal Clean Air Act Section 112 (Hazardous Air Pollutants).

Rule Adoption Relative to Cost-effectiveness

Proposed Amended Rule 1401 is not a control measure in the 2003 Air Quality Management Plan (AQMP) and, thus, was not ranked by cost-effectiveness relative to other AQMP control measures in the 2003 AQMP. Cost-effectiveness in terms of dollars per ton of pollutant reduced is not applicable to rules regulating toxic air contaminants. Under Rule 1402, if a facility is required to reduce risk, control approaches could be analyzed to determine the cost effectiveness for that facility only, and would not be applicable to another facility or industry.

Incremental Cost-effectiveness

Health and Safety Code Section 40920.6 requires an incremental cost effectiveness analysis for Best Available Retrofit Control Technology (BARCT) rules or emission reduction strategies when there is more than one control option which would achieve the emission reduction objective of the proposed amendments, relative to ozone, CO, SO_x, NO_x, and their precursors. Since the proposed amended rule applies to toxic air contaminants, the incremental cost effectiveness analysis requirement does not apply.

Comparative Analysis**Health and Safety Code Section 40727.2**

California Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report. In order to determine compliance with Sections 40727 and 40727.2, a written analysis comparing the proposed amended rule with existing regulations is required.

A comparative analysis, as required by the Health and Safety Code Section 40727.2, is applicable when a new or amended rule or regulation imposes, or has the potential to impose, a new emission standard. Rule 1401 is a new source review for air toxic contaminants. Proposed Amended Rule 1401 may impose control requirements depending on the health risk (derived

from the new/revised risk values) from equipment. There are no comparable federal or state requirements for new source review for toxic air contaminants.

The proposed amendment to Rule 1401 and update to the AQMD's "Risk Assessment Procedures for Rules 1401 and 212," affects Rule 1402, which uses the Rule 1401 list of TACs to set facility-wide risk threshold for existing facilities. Under Rule 1402, if a facility is required to reduce risk, the facility may choose any strategy which reduces facility-wide risk to below 25-in-one-million. Therefore, the proposed addition/revision of chronic and acute risk values for acetaldehyde, acrolein, arsenic, formaldehyde, fluorides, mercury, and manganese does not duplicate any of the standards or requirements of existing AQMD, state, or federal regulations.

Existing Federal and State Requirements

The compounds included in this Rule 1401 amendment are identified as a Hazardous Air Pollutants (HAPs) pursuant to subsection (b) of Section 112 of the federal Clean Air Act and have been designated by the State Board to be toxic air contaminants pursuant to Health and Safety Code Section 39657. These regulations do not assign risk values for the affected compounds. The proposed amendments to Rule 1401 do not duplicate or otherwise conflict with these regulations.

Applicable AQMD Rules

The addition of this list of compounds to Rule 1401 also affects facilities subject to Rule 1402 which relies on the same list of TACs. The difference between Rules 1401 and 1402 is that Rule 1401 applies to new, modified, or relocated equipment whereas Rule 1402 applies to existing facilities.

REFERENCES

REFERENCES

Air Toxics Hot Spots Program, Technical Support Document for the Derivation of Non-cancer Reference Exposure Levels; Office of Environmental Health Hazard Assessment (OEHHA), California Environmental Protection Agency; June 2008

Air Toxics Hot Spots Program Risk Assessment Guidelines Part I: The Determination of Acute Reference Exposure Levels for Airborne Toxicants; Office of Environmental Health Hazard Assessment (OEHHA), California Environmental Protection Agency, 1999

Air Toxics Hot Spots Program Risk Assessment Guidelines Part III: Technical Support Document for the Determination of Noncancer Chronic Reference Exposure Levels; Office of Environmental Health Hazard Assessment (OEHHA), California Environmental Protection Agency, 2000.

Initial Statement of Reasons for Rulemaking, Staff Report/Executive Summary, Final Report on the Identification of Formaldehyde as a Toxic Air Contaminant; CA Air Resources Board and the Office of Environmental Health Hazard Assessment (OEHHA), July 1992

National Air Toxics Program: The Integrated Urban Strategy, Report to Congress, Appendix-HAP Profiles; U.S. Environmental Protection Agency, Office of Air and Radiation; July 2000

Prioritization of Toxic Air Contaminants Under the Children's Environmental Health Protection Act; Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, October 2001

Risk Assessment Procedures for Rules 1401 and 212, Version 7.0; SCAQMD; July 1, 2005;
<http://www.aqmd.gov/prdas/Risk%20Assessment/RiskAssessment.html#CurrentRiskAssessment>